SPATIAL STRUCTURE AND URBAN TYPES OF THE DANUBIAN AREAS

Introduction

Since the birth of the EU Strategy for the Danube Region, several scientific issues have been raised by the Strategy, which has also led to discussions on the Danube Area as a development macro-region (*Hardi* 2010). It is clearly visible that beyond the Danubian examinations done so far, with their focus primarily on culture and arts, more and more emphasis is put on the survey of the relationship between the river and the socio-economic space (*Dövényi–Hajdú–Glatz* 2002; *Cser et al*. 2008; *Rechnitzer* 2009; *Hardi* 2012); also, this will have a practical significance as an effect of the efforts of the European Union. During these surveys basic questions will also have to be answered. In what and when is the generally acknowledged "development" role of the Danube River manifested? Is there a Danube Area, and is there a genuine Danubian identity? If so, what does it involve, and how is it related to the concept of Central Europe, another concept evoking many debates? We often hear the concept "Danubianness"; it is easy to express this idea in general, but it is hard to find its real content in regional development. What is the role of the river in the strategy? Is it only a symbol or is it an exactly defined resource that we must use and preserve together, in cooperation during the developments?

This study demonstrates on these grounds how the Danube River may shape the spatial structure of the Danube region, two aspects of which are highlighted: the river as a potential social and economic development axis, and the river as an obstacle, a border that determines the transport and spatial structure of the area, the region, and also the development of the cities along the river.

1. The river and the spatial structure of the Danube Region

In our paper the concept 'spatial structure' means the special pattern of the space which is created by the order of the geographical locations of development axes, borders, centres and peripheries. This pattern is determined by the elements of the natural environment, but also by the characteristics and the external and internal points of reference of the socio-economic development. The mutual relationship between big rivers and the socio-economic space surrounding them is a phenomenon easy to prove. During history, rivers shaped the inner structure of their environment as transport routes, sources of water and transportation obstacles. It is evident, on the other hand, that the river itself is not the sole driving force that affects the development characteristics of the areas along its banks; the development level and development process of the riverside areas also has a reverse effect on the use of the river and its role in spatial structure as well. The relationship system of the river and its environment can lead to many different spatial structural types then. We do have to examine these formations in order to understand the potential of the river to shape the socio-economic space, and the factors of this potential. We can often see small rivers in extremely intensive economic environment significantly contribute with their adequate functions to the economic performance of the given area, region. Elsewhere, we might see economically lagging regions along huge rivers, areas that cannot utilise the endowments offered by the natural resource, making the role of the river negligible in the development of the area; in fact, the river may even be an obstacle in such a case.

From a spatial structural view, a river may be a border (obstacle) and a development axis. As an obstacle, a river separates areas from each other, and creates nodes where it can be crossed (bridge, ferry, or ford). As a development axis it attracts economic activities either by offering transport facilities or by providing water. Of course these functions have varying intensity along the respective sections of a river, so we can find areas at different development levels along the same river, with similar environmental endowments.

1.1. The river as a development axis

The role of the river may have changed in the various phases of the history of economy and society. In the initial phases of technical development, rivers served as transport routes of fundamental importance, as they offered potential alternative for mass goods transportation, as opposed to problematic and small capacity land transportation (think of the horse drawn wagons, primitive roads and the crossings of marshes and rivers). Of course, these were not advantages for long distance, because prior to the birth of steam navigation, river goods transport, especially upstream, was problematic, time consuming and expensive. Accordingly, before 18th century rivers had a dominant role in transportation where goods had to be distributed over a short distance, i.e. as a supplement to sea trade (the Low Countries, England). In areas in the proximity of seas and oceans a significant network of artificial canals was also constructed[i], which greatly improved the efficiency and usability of inland navigation.

Rivers farther from the sea were more of obstacles in the way of the development of socio-economic space. Major economic centres were typically born in the junctions of the river crossings. The density of these centres was actually dependant on the network of the land routes of commerce and on the urban network. Accordingly, the density or sparseness of the riverside centres lets us know if the Danube River functions as a developed spatial structural axis or a separating border with only secondary role in the birth of these centres.

The importance of rivers in the inner areas of the continents was increased by inner shipments in the 18th century (*Gráfik*2004). The industrial development of the Western part of Europe, the cereals boom and the decoupling of the economy of the European continent demanded long distance trade of large amounts of cereals, which at that time was mainly possible on water. This made access from the inland rivers to the sea ports more and more important. Thus the first great canal construction fever of Central Europe started in the late 18th century. This was the time of several canal construction initiatives that promoted the transportation of cereals (e.g. the Danube–Tisza Canal in the area of the present Voivodina region). In Western Europe, an even larger number of canals were constructed in the inland areas. From the 1810s, steam navigation further improved the efficiency of inland water transportation, and the unfurling industry also demanded the construction of cheap and high performance transport capacities.

This was the time when rivers became a factor determining the location of industry, economy, and through them spatial structure. The regional role of rivers increased where not only a river could be found but a complete system of tributaries, constructed canals, ports, and loading points. In the case of the Danube River no such network could be born, despite the demand that existed for it.

In Central Europe, the belated development of industry, in addition to several other effects, blocked the construction of the canal network, because the transport demand of industry could be satisfied by the already existing railway, and investment capital and state subsidies available for investments were absorbed by railway constructions. The priority of railway constructions was also reinforced by the need to create a national economic space (railway, less dependant on the geographical environment, could much better cover the single space than waterways whose construction was expensive and slow [*Berend–Ránki* 1987]). As a matter of fact, railway was actually a more expensive means of transportation. So the distribution of many products was more costly than earlier. The two networks (waterways and railways) were not constructed then after each other, as in Western Europe, but parallel to one another; in this competition, railway was the winner, for several reasons (building of the nation state, the economic interest of the investors, and the transport demand of the majority of the

economic actors). The utilisation of the advantages offered by water transportation launched two other canal construction waves in Europe and the world: one on the turn of the 19th and 20th centuries and one in the middle of the 20th century, inspired by the large industrial developments of Central Europe.

In this European region, considerable ideas were made also for the Danube River (*Kaján* 2004) by Austria, Hungary and the newly created states along the Lower Danube, and the great powers supporting them. These plans included the connection of Vienna to the mining regions of the Austro-Hungarian Monarchy, the linking of the Danube, the Elbe and the Oder River systems, and the shortening of the Danubian navigation way in the Balkans Peninsula by the construction of canals to the nearest sea ports. Actually all of these would have served the integration of the isolated, landlocked areas to the globalising sea trade (*Erdősi*2008). Several of these ideas were realistic concepts, for the implementation of which laws were passed in Austria and Hungary. However, the history of 20th century intervened; the wars of the century blocked the construction of these network elements, the Danubian region was divided into states that were often enemies to each other, so the existing and the would-be network were fragmented by politics.

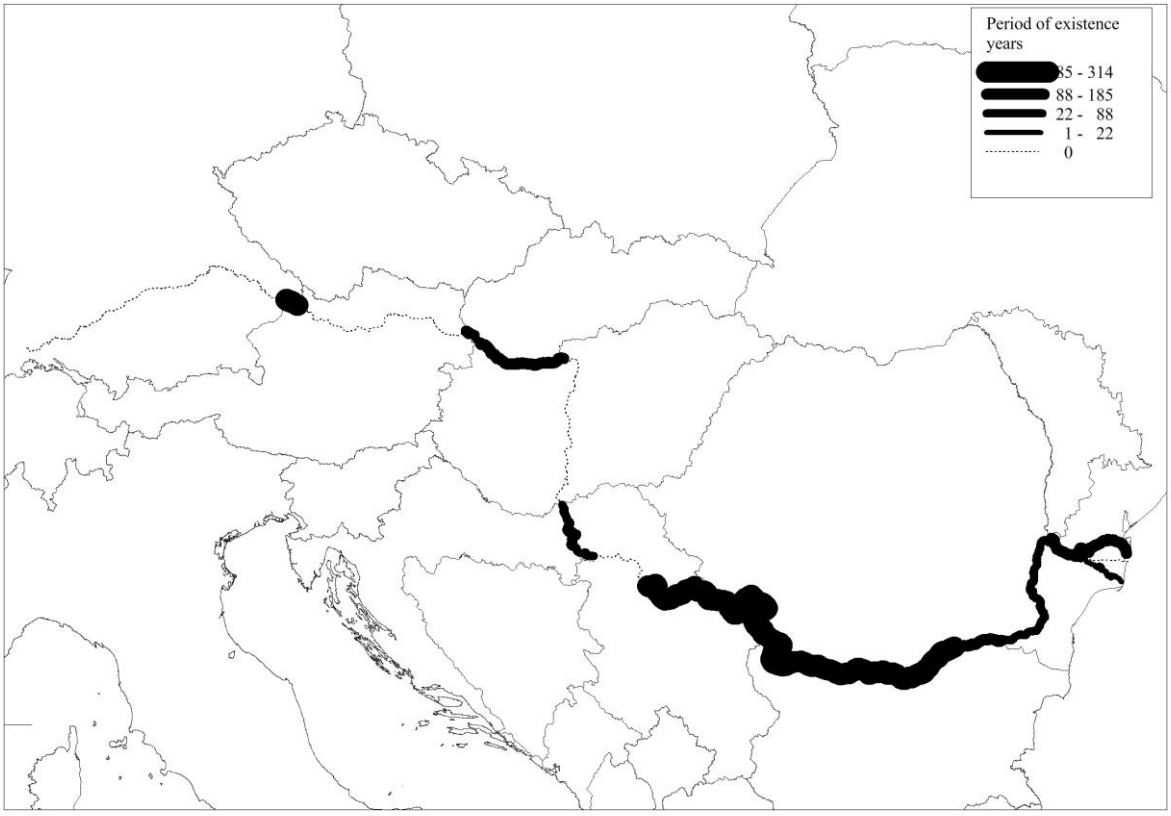
As a summary the Danube River shaped the socio-economic space of Central and Southeast Europe not primarily as a transport corridor but by the junctions, cities born on its banks, often at the former crossing points. These junctions are either densely or a scarcely located along the river, depending on the economic development level of the respective regions. The river serves a development axis only in short sections, i.e. in the Vienna-Budapest region. However, even the development of this axis was not connected only to the Danube River but to the land transportation axes on it bank, and also on the junctions of the crossing axes.

1.2. The river as an obstacle: borders, bridges

The Danube River as a state border

At the drawing of state borders rivers are frequently used natural objects. Most typical are state borders drawn along large rivers. The river is not a separating object by its nature. It is interesting that the Danube River did not make either a state or an inner administrative (regional) border in several sections (in Germany, Austria). On this basis the German and Austrian sections of the Danube River are basically different from the other ones (Figure 1).

Figure 1: The Danube river as state border in the history (since 1699)



Source: own work.

In these countries regions are situated on both sides of the river; in fact, the Danube River plays an important role in their lives, as the main transport lines and the regional centre of Upper Austria (Linz) can be found in the river valley. In Germany the Danube River is only a border between Ulm and Neu-Ulm cities, between the regions of Baden-Württemberg and Bavaria, and downstream from Passau it is a border between Austria and Germany. In Austria the river is border between Upper Austria and Lower Austria at a section of about 35 kilometres. During the existence of the historical territory of the Hungarian Kingdom this non-border character of the river was typical right down to Budapest (with the exception of Pozsony [today's: Bratislava] county's border). Downstream from Győr, Hungarian counties were located on both banks, with a Danubian centre (Komárom [Komarno], Esztergom, Pest [Budapest]). The last of the Hungarian counties located on both banks of the river was Pest county. (*Hardi–Hajdú–Mezei* 2009). The border role of the Danube River became really typical downstream from Pest: from this part the Danube River was a county border all the way, then a state border from the mouth of the Sava River, practically right to its Delta. The state border function of rivers was changed for a long time by the Berlin Congress (1878), when a significant part of Dobrugea was given to Romania, and this area was further enlarged in 1913 by the closing of the 2nd Balkan War (South Dobrugea). Today this area is a territory of Bulgaria again. Still one of Europe's oldest existing borders is the 470 kilometres long state border between Bulgaria and Romania, but the reason for the birth of this sharp border is the differing characters of the regions (south: the Bulgarian plateau, north: the Romanian plain) and not the separating role of the Danube River (Cholnoky 1925; Prinz, date unknown). The Danube River today is a real border river from the Slovak-Hungarian border; downstream from this, in three-quarters of its sections to the Delta it is state border, and in the majority of the remaining one-quarter it is usually a regional centre.

In this form the Danube River as a border river made the border between the Austro-Hungarian Monarchy and Turkey (and also Bessarabia/Russia) in a section of 1,203 kilometres before 1878, from its total length of 2,922 kilometres calculated at the Chilia Branch. By the annexation of Dobrugea to Romania, a 374 kilometres long intra-state section was made, while in the middle reaches new Danubian borders were made by the disintegration of the historical Hungary and Yugoslavia, in the early 20th century and the end of the 20th century, respectively: (Czecho)Slovakian-Austrian, Czechoslovakian-Hungarian, Serb-Croat and Serb-Romanian sections (the latter enlarged). On the whole, almost one half (1,197 kilometres) of the total length of the Danube River is a state border between two countries. The lasting state border character resulted in the birth of interesting city pairs opposite to each other along the Lower Danube. This phenomenon can be seen downstream from Belgrade, but it is most typical along the Bulgarian-Romanian border, where almost each city has their counterpart on the other bank of the river (Hardi 2002; Săgeăta 2004). The historical role of these cities was defence and not cooperation. The Danubian border had a strong separating function and is still a significant obstacle to communication (from which the only exception is the city pair of Giurgiu–Ruse, connected by a bridge [Waack 1996])1.

The possibilities of crossing: bridges

A bridge across a river bears many symbolic elements. It connects the two banks, creating connections between often different cultures and various socio-economic landscapes. The role of bridges as symbols also demonstrates their significance in the life of the economy and society, simply manifested through the movement opportunities of people and goods. Bridges, in the broader sense river crossings (ferries and fords) are outstanding points of the socio-economic space, and may have an impact on the structural elements and development axes of this space.

A bridge across the river is seen as a constant crossing point that leads across a geographical-spatial obstacle. Accordingly, from its technical specifications the only thing that matters is that it offers a "constant" crossing possibility for traffic, without travellers either having to wait for a longer time or, most often (depending on the type of the bridge), to change their transport means, which would significantly increase transport costs. This way bridges can become very important objects for the shaping of the spatial structure.

Bridge construction is a costly enterprise, and the related costs are evidently dependant, in addition to the distance to be bridged, upon the technical character of the bridge and the features of the river bank. On navigable rivers, when making decision on the height of the opening of the bridge, the fluctuation of the water level must also be taken into consideration, together with the height necessary for the safe passing of the ships. The height of the present Danube bridges is usually 7–9 metres above the high water level, and evidently the newly built ones can offer even higher spaces for the passing of ships. In addition, the expenses of bridge constructions are largely increased by the provision of the infrastructure leading to the bridge, which is a significant extra expense (*Tőry* 1952).

The size of the Danube River reaches a magnitude at Ulm where the bridging of the river (due to the width of the Danube and the volume of ship traffic) is a challenge for bridge construction. In the approximately 269 kilometres long section between Donaueschingen and Ulm, a total of 86 road-, pedestrian and railway bridges cross the Danube River, which means that we find a bridge across the river at every third kilometre, on the average. Of course it had been easier here to create a constant crossing point earlier, with less sophisticated bridge construction techniques.

[1] At the time of the writing of this paper (2012) a second bridge of the Romanian Bulgarian Danube section is under construction between Calafat and Vidin.

The construction of the present bridges (and the ones broken down in the last decades) was typically started in the second half of the 19th century. The oldest of the presently standing bridges that manage road traffic is clearly the Chain Bridge in Budapest, built between 1839 and 1949. A large number of bridges were built in the 19th century, especially in the big cities like Vienna, Pozsony (the now Bratislava), and between Buda and Pest (two separate cities at that time). Considering the time and the technique of bridge constructions, Hungary did not lag behind the other states of Europe. Outside the cities, no major road crossings were constructed, traffic was done by ferries. The development of the Hungarian railway network was done in a way that that the main lines did not cross the Danube River (except for the Budapest–Zimony – now part of Belgrade – line that was led across the Danube in 1883 at Újvidék, the now Novi Sad). This way no railway bridges had to be constructed (apart from the Hungarian capital city where the southern railway bridge was completed in 1877). At the end of the 19th century the new local railway lines made the construction of the first railway bridges necessary. The road and railway bridge at Baja was constructed in the 20th century, already, it was completed in 1908 (*Tőry* 1952).

The construction of the further bridges took place in the time between the two world wars, and the rapid increase in their number after World War II is due to the growing car traffic and the penetration of the use of car as a long distance transportation tool. Hungary was not very active at that time in constructing bridges outside the capital city. No major efforts were made for handling the Budapest-centred character of the Hungarian transportation network, traffic was managed by crossing facilities built in the first half of the century and damaged in the war. In the upper and lower reaches of the river, constructions were going on, partly of the new hydroelectric plants that also became crossing points and partly the newly built road bridges that greatly increased the density of bridges. Similarly, the crossing facilities of Yugoslavia (today's Serbia), increasing the territorial integrity of the country, were constructed after World War II (*Nagy–Miletic–Todorovic* 2009).

In order to analyse the present situation, we examined the bridge density indices of the respective reaches of the Danube River (Table 1). We took the navigable main branch of the Danube into consideration, and neglected the bridges across the side branches. Also, we did not consider those connection points on the main branch across which no traffic is possible, so we only calculated with the pedestrian, bicycle, road and railway bridges leading to the other bank of the river and not to an island or a building located in the river. The selection of the reaches used for the survey was somewhat arbitrary, especially in the middle and the southern reaches. In these sections the spatial distribution of the bridges is extremely uneven, there are many state borders located on the water, so we wanted to separate in the survey the city agglomerations and the inland and border sections.

We counted a total of 234 bridges in the total length of the river, which, calculating with a 2,840 kilometres total length of the Danube River, means a density of 12 kilometres/bridge. If we make the calculations from the mouth of the Rhine-Main-Danube Canal, only (at river kilometre 2,414), we find a bridge at every 25 kilometres across the Danube River, on the average. If we take the characteristics of the respective reaches into consideration, we can see that the average distance between the bridges increases as we proceed downstream. While we can see a figure of 3.1 kilometres/bridge in the upper reaches of the Danube, the sparsest crossing possibilities can be seen along the Romanian–Bulgarian section: only one possibility for the whole length of 470 kilometres. This number will increase to two by 2013 when the new bridge at Vidin is completed.

The average (25 kilometres/bridge) is most typical in the Hungarian section. If we break the Hungarian section, we can see that the part downstream from Budapest is the start of the scarcely crossable section of the Danube River. Upstream from Budapest the density of bridges is around or above the average, downstream from the Hungarian capital city it never comes even near the average.

We dealt separately with the capital cities and their agglomerations, i.e. Vienna, Bratislava, Budapest and Belgrade. We can see a definitely high density of bridges across this section of the Danube River.

Vienna, Bratislava and Budapest are very much similar to each other as regards the density of bridges. The outstanding value of Vienna is attributable to the existence of two pedestrian bridges and two bridges solely used by the U-bahn. If we neglect these bridges of local significance, the figures of Vienna are similar to those of the other two capital cities. The agglomeration of Belgrade does not have a similar density of bridges; this is why we did not deal with it separately within the Serbian inland section of the Danube River. This is partly due to the fact that the city of Belgrade and the major part of its agglomeration are on the south bank of the river, and are more cut into two by the Sava River. On the north bank of the Danube River there are only a few settlements (although municipalities with a large number of population and a rapid growth, like Pančevo), and they are connected to the capital city of Serbia by one bridge, only. There is a definite intention for the increase of the number of bridges across the Danube in Belgrade (*Nagy–Miletić–Todorovic* 2009), but presently there is one bridge, only, so the density of bridges is not comparable to that in the other central regions, in Austria, Slovakia and Hungary.

So in the reaches downstream from Budapest, the decrease of the density of bridges is not altered significantly by the central regions (Belgrade and Bucharest). Within the former Yugoslavia, the main economic and transport axis was the Zagreb–Belgrade–Nis line, and developments were also concentrated here. This line, however, does not cross the Danube River, only the Sava River at Belgrade, and so the Danubian bridge constructions mainly aimed at integrating the Voivodina region, north of the river, into the economic life of the country. The spatial structure of today's Serbia, on the other hand, is different now: the priority of the northwest-southeast direction was replaced by the primacy of the north-south (Subotica–Nis) one (*Nagy–Miletić–Todorovic* 2009), and the transport axis serving this direction has just been constructed (2011–2012). A part of this is a large capacity Danube bridge. At the Serb-Romanian joint section of the Danube River, a crossing possibility is given by two hydroelectric power plants built in the 1970s, the Iron Gate I and Iron Gate II. Their road capacity is limited, the main purpose of their construction was electricity production, and crossing facility was of secondary importance.

As we have already mentioned, the nadir of the crossing possibilities can be seen at the Bulgarian-Romanian border, where the only bridge at the no less than 470 kilometre river section is the "Friendship Bridge" between Giurgiu and Ruse, and the second bridge is just under construction, between Vidin and Calafat.

At the section within Romania, three bridges cross the Danube River, two of which can be found at Cernavoda, practically right next to each other: a bridge with mixed use, with road and rail tracks and a railway bridge. Both facilities serve the same transport axis, the Bucharest–Constanta road and railway line. If the bridge of the motorway under construction is completed, another crossing facility will be created at practically the same point. Because these crossing points manage the traffic between the capital city and the port city, they are unlikely to exert a major spatial development effect.

Approximately 62 river kilometres downstream from Cernavoda we find the third bridge of the inner Romanian Danube section. We can see that within the relatively long Romanian inner section the bridges are located within a relatively short distance and serve the connection between the capital city and the seaside, and also Dobrugea. In the Delta area, the height of the large sea ships, bridges with so large openings should be constructed whose construction costs would exceed by far the benefits expected from the traffic.

Table 1: Number and density of bridges at the respective Danube sections, 2011
(calculated at the main navigation branch of the river)

Danube section	Rounded length of section (km)	Number of bridges	Average density of bridges (bridge/km)
Downstream from the joining of the two river sources (from Donaueschingen to Ulm)	269	86	3.1
From Ulm to Kelheim, the mouth of the Rhine-Main-Danube Canal	189	51	3.7
From the mouth of the Rhine-Main-Danube Canal to the Austrian-German border	188	34	5.5
The complete Austrian section	343	30	11.4
From which			
From the German border to Tulln	258	16	16.1
Vienna agglomeration (Tulln–Slovak section)	85	14	6.1
From Devín to the mouth of the Ipoly River (Slovak and joint Slovak-Hungarian section)	164	9	18.2
From which:			
Bratislava agglomeration Devín–Sap (the inner Slovak section at the navigation corridor)*	*69*	*5*	*13.8*
Sap–Ipoly mouth (Slovak–Hungarian common section)	*103*	*4*	*25.8*
From the mouth of the Ipoly River to the Hungarian–Croat/Serb border	275	11	25.0
From which:			
Budapest agglomeration (Ipoly–Nagytétény)	*77*	*7*	*11.0*
Nagytétény–state border	*198*	*4*	*49.5*
From the Hungarian–Croat/Serb border to the mouth of the Timok River (Bulgarian border)	587	10	58.7
From which:			
Croat–Serb common section	*137*	*2*	*68.5*
Serb inner section	*221*	*6*	*36.8*
Serb–Romanian common section	*229*	*2*	*114.5*
Bulgarian–Romanian common section **	472	1	472.0
Romanian section	374	3	124.7

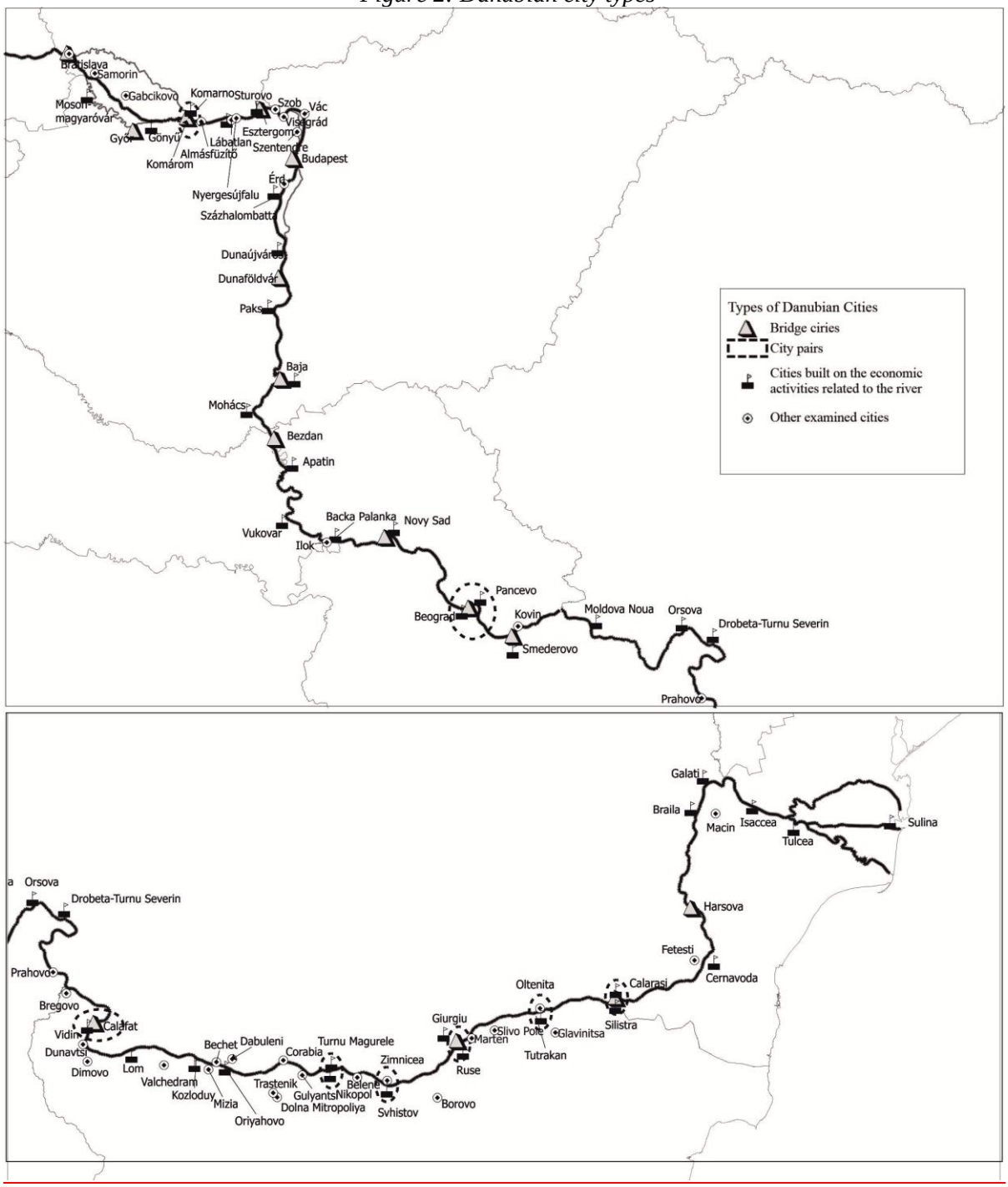
* At this section we did not take the natural main branch of the Danube River into consideration but the artificial bypass canal whose length is similar to that of the natural river bed, but there is a crossing on it (at Gabčikovo).
** In 2012 the second bridge of this section is almost completed. After its completion the index of the density of bridges will decrease to 236 kilometres.
Source: calculations by the authors, on the basis of Google map and Donaukommission 2004.

As it can be seen from our overview, bridges have a special role in the shaping of the spatial structure. Their location and density are largely dependent on the inner spatial structures of the regions across which the river flows, but the river itself shapes the spatial structure, reinforces the already existing spatial tracks and may create new ones. It can be said that the designation of the position of bridges has a strategic importance for a region or a country, or even a larger macro-region.

2. The impact of the Danube River on urban development

The spatial structure featured above is matched by the riparian cities too. Characteristic city types evolved along the Danube River, whose existence and development was linked to the river. Three characteristic types of these can be separated: 1) bridge cities that are situated on one bank of the river or on both banks, or in the vicinity of the bank; 2) city pairs that are defence formations along the river that was a border for a long time; and 3) cities created by activities related to the river *(Figure 2)*. These three characteristics can of course be present at the same time in the same city, and can evolve into each other during the course of development.

Figure 2: Danubian city types



Source: By the authors.

- Bridge cities. The birth of this city type is linked to the crossing facilities on the river (*Mendöl*1963). Crossing at the time of the start of goods transport was possible in certain easily crossable sections of the rivers (fords, ferry), which could only be used temporarily. Due to this, at these favourable locations special functions were established for the storage of goods, with a consideration to those times when the river cannot be crossed (ice drift, flood, low water level etc.). This means that they were built right on the river bank or, if that was not suitable for settlement, a little bit farther away from that. These points attracted trade routes, so later the permanent bridges were built there. After the construction of the bridge the established centre continued to develop. Typical cities at the upper and middle reaches of the river are the bridge cities that developed to become regional centres or capital cities. They are junctions of the socio-economic development in all cases. Their speciality is that they usually were established on one bank of the river, then, after the construction of the bridge, they became two-bank cities either by natural growth or the integration of smaller settlements on the other side. This type involves the capital cities (Vienna, Bratislava, Budapest, and also Belgrade from the 20th century[2]), and also the riverside regional centres like Ulm, Regensburg, Passau, Linz, Győr, Komárom, Esztergom, Baja, Sombor, Vukovar, Novi Sad and Smederevo.
- City pairs. On the river sections making borders, the birth of cities opposite to each other on the two banks was typical. These cities were usually border cities and fortresses during their history, and their main function was to control Danubian traffic and the possibility of crossing. Several such city pairs can be found at the lower reaches of the Danube River (*Săgeăta*2004). These cities still develop in a relative isolation from each other, and the level of socio-economic relationships between them is low. Independent of each other, similar economic structures were built out in them (e.g. cellulose manufacturing). On the basis of the present economic situation of the cities, a more intensive cooperation can only be expected in the longer run. The only exception from this is the Giurgiu–Ruse city pair, where the only existing road and railway bridge was constructed in the fifties of the 20th century. The city pair has the chance to become a dynamic common bridge city in the foreground of Bucharest. Another city pair with such potential is Vidin and Calafat, between which the second bridge of the Romanian–Bulgarian Danube section is under construction. The cohesion between these two cities is weaker than in the case of the former city pair, but the completion of the large capacity bridge and the related transport corridor may improve the situation. This seems to be a contradiction, on the other hand, to the fact that Vidin is located in one of the poorest regions of Bulgaria (and the whole of the European Union), having suffered a considerable economic decline in the recent years. It is feared that the corridor to be built will exert the "channel" effect described by Ferenc Erdősi, i.e. traffic will simply rush above them, without having an economic development impact (Erdősi 2008). By the development of water transportation, however, it may become an important logistics centre.
- Cities built on the economic activities related to the river. This category involves cities serving the management of navigation, which not necessarily and not exclusively entails port functions but for example traffic junctions determined by geographical endowments. Such cities are e.g. Moldova Veche, Moldova Nouă, Orşova and Turnu Severin at the Lower Danube. These settlements were traffic points for ships passing through the difficult sections of the river, where they had to wait in case of water levels not suitable for navigation, and these were also the cities where the pilots obligatory for passing through were hired. A similar function was played by Tulcea in the Delta area. An important traffic point on the upper Hungarian reaches is Gönyű, which did not develop into a city because of the vicinity of Győr, but its importance in Danubian navigation far exceeds its size. In KálmánTőry's words, it is the "shunting yard" of the Danube River, because the reach upstream from this is hardly navigable, so ships coming from the east with full load were forced to unload or reload to other, smaller vessels (Tőry 1952). This function strengthened in the 18th century: from contemporary documents fishing seemed to be the main occupation at that time. During the

[2] Of course the growth of these cities was affected in history by several other factors in addition to the bridge city role. The possibility of crossing in itself only designated their exact location.

18th, 19th and 20th century, navigation became the main source of living for the settlement[3]. In the Bačka Region, Bačka Palanka became the centre of cereals transport, despite the fact that it is not located right on the river bank. During the time of industrialisation, several settlements grew up that relied on the transport capacity or the industrial water of the Danube River; the river typically attracted centres of heavy industry, chemical industry or energy production. Cities of these activities are Linz, Almásfüzitő, Dunaújváros, Paks, Smederevo, TurnuSeverin, Vidin, Lom, Kozloduy, Călăraşi, Cernavoda etc.

Of course there are transitory or transforming types among these cases as well. An example for this is the Komárom/Komarno city pair that used to have county seat function, on the northern bank of the Danube River (so it was a single-bank city), with a functional foreground on the other bank (Újszőny), and it transformed into a city pair after the drawing of the state border. Also, Novi Sad and Belgrade changed from being border cities (city pairs) into two-bank regional centres. There are cities that fit into several categories. Dunaújváros was born as an industrial city built on the Danube River, but now, having a bridge, is an important bridge city that is a rapidly developing centre. Several cities have both industrial and port/traffic functions, such as Linz, Smederevo, Lom, Galaţi etc.

These examples clearly show that the impacts of the Danube River on the urban network and its impact on spatial development, through the centres, are existing phenomena. These impacts could not only be seen in the past but in these days as well.

Summary

The examples discussed above demonstrate the significant role of the Danube River in shaping the spatial structure of Central Europe and Southeast Europe. This role, however, is not uniform for the whole of the river, it varies section by section. It is manifested in two spatial levels, basically: the river valley with its northwest-southeast direction satisfied the transport demands of an important European migration flow during the past centuries, especially at the upper and middle reaches of the river, determining thereby the development patterns of the Middle Danubian basins. Our paper mainly deals with those impacts that the Danube River exerted at regional level and which are directly linked to the river as a resource or a spatial structural obstacle. Our findings suggest that the river determined the development of the surrounding regions mainly by the junctions born at crossing points, and less as a natural resource, a waterway etc. Due to different reasons, the Danube region did not use, could not use the opportunity to fully utilise this integration and spatial organisational factor.

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[i] Of course we know that in, e.g. the Low Countries, it was not only transport demand that determined the construction of the network of canals, in fact, it was not even the primary reason. The main motivation was the several centuries of fight of the Dutch against the dangers of the sea and for the reclamation of land from the sea (polders). The network born by constraint was created, anyway, and was – and still is – also used for transportation, later for irrigation and still later for tourism purposes.